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16<sup>th</sup> International Symposium of Fluorine Chemistry (Durham, UK, 23 Jul 00) (Submission Deadline: 18 Apr 2000)

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Propulsion Science and Advanced Concepts Division

## USE OF FLUORINE CHEMISTRY FOR THE SYNTHESIS OF POLYNITROGEN COMPOUNDS

K. O. Christe,\* W. W. Wilson, A. Vij, V. Vij, J. A. Sheehy, J. A. Boatz, F. Tham

Air Force Research Laboratory, Edwards Air Force Base CA, USA, Loker Hydrocarbon Research Institute, University of Southern California, Los Angeles, CA, USA, and Department of Chemistry University of California, Riverside, CA, USA

Fluorine chemistry plays an important role in the synthesis of novel polynitrogen compounds. Thus, the reaction of  $N_2F^+AsF_6$  with  $HN_3$  in anhydrous HF solution has been shown to yield  $N_5^+AsF_6$ , a white solid that is marginally stable at room temperature and represents the first new stable homoleptic polynitrogen species in more than 100 years. We have now succeeded to prepare the  $N_5^+SbF_6$  salt in high purity and yield and to record its complete vibrational spectrum. The compound is surprisingly stable, up to 70 °C, and exhibits little shock sensitivity. During attempts to recrystallize the compound from  $SO_2/SO_2ClF$  solutions, another new  $N_5^+$  salt,  $N_5^+Sb_2F_{11}^-$ , was obtained and its crystal structure was determined. The V-shaped configuration and the bond lengths and angles, predicted for  $N_5^+$  by our previous theoretical calculations, were confirmed. The reaction chemistry of  $N_2F^+$  salts with other hydrogen containing species will be briefly discussed.